

CLAIMS.

1. A method of treating a patient for a neuro-degenerative disorder comprising administering to that patient a therapeutically effective amount of one or more of D- β -hydroxybutyric acid, acetoacetate, or a metabolic precursor or physiologically acceptable salt of D- β -hydroxybutyric acid or acetoacetate, such as to elevate the patient's blood level of ketone bodies, defined as the sum total of D- β -hydroxybutyric acid and acetoacetate, to a therapeutic level effective to treat the disorder
wherein when a metabolic precursor is administered it is not hydroxybutyryl carnitine.

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2. A method of treating a patient in order to treat a neuro-degenerative disorder comprising administering to that patient a therapeutically effective amount of at least one of D- β -hydroxybutyric acid, acetoacetate, or a metabolic precursor or physiologically acceptable salt of D- β -hydroxybutyric acid or acetoacetate, such as to elevate the patient's blood level of ketone bodies, defined as the sum total of D- β -hydroxybutyric acid and acetoacetate, to a therapeutic level effective to treat the disorder
wherein the patient's blood level is elevated to from 0.3mM to 20mM.

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3. A method of treating a CNS cell, peripheral nerve cell, or otherwise insulin insensitive cell in need of therapy for one or more of neuro-degeneration, GABA preventable seizure, or insufficient ability to metabolise glucose, comprising administering to that cell one or more compounds selected from the group consisting of D- β -hydroxybutyric acid, acetoacetate, compounds which are oligomers of D- β -hydroxybutyric acid, acetoacetyl esters of D- β -hydroxybutyric acid and acetoacetyl esters of oligomers of D- β -hydroxybutyric acid, and physiologically acceptable salts thereof.

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4. A method of treating an patient for epilepsy, diabetes or an insulin resistant state comprising administering to that patient a therapeutically effective amount of one or more compounds selected from the group consisting of D- β -hydroxybutyric acid, acetoacetate and metabolic precursors of D- β -hydroxybutyric acid or acetoacetate which comprise

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moieties selected from the group consisting of R-1,3-butandiol, acetoacetyl and D- β -hydroxybutyryl moieties and physiologically acceptable salts and esters thereof.

5. A method as claimed in any one of Claim 1, Claim 2, Claim 3 and Claim 4 wherein on administration of the compound to an unfasted patient in need of such therapy, the blood level of ketone bodies, defined as the sum total of D- β -hydroxybutyric acid and acetoacetate, is raised to between 0.3 and 20mM.

10 6. A method as claimed in Claim 1 or Claim 2 wherein the neurodegenerative disorder is selected from the group consisting of neurodegenerative disorders involving inability to metabolise glucose, memory loss in ageing, neurotoxic peptides or proteins, and genetic abnormality.

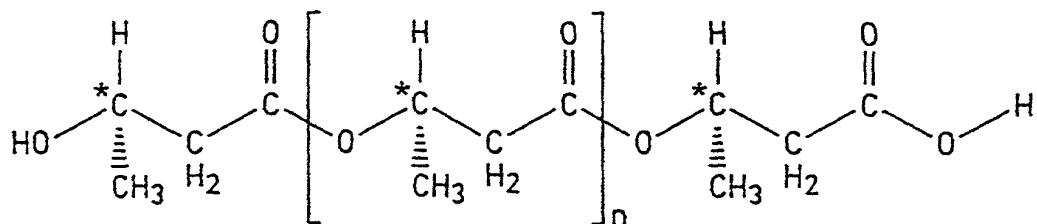
15 7. A method as claimed in Claim 6 wherein the neurodegenerative disorder is selected from those involving neurotoxic protein plaques.

8. A method as claimed in Claim 1 or Claim 2 wherein the metabolic precursor is selected from the group consisting of Free Fatty Acids and compounds comprising 1,3-butandiol, acetoacetyl or D- β -hydroxybutyryl moieties.

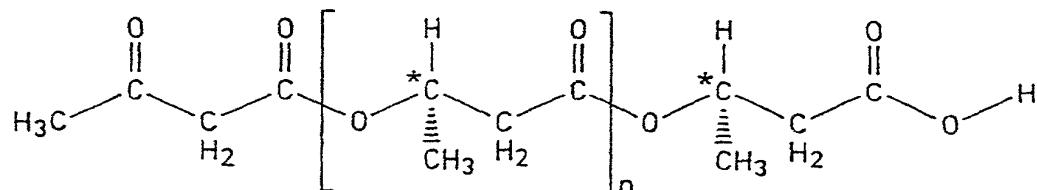
20 9. A method as claimed in Claim 1, Claim 2, Claim 3 or Claim 4 wherein the metabolic precursor is a polymer or oligomer of D- β -hydroxybutyrate.

10 10 A method as claimed in Claim 9 wherein the metabolic precursor is an acetoacetyl ester.

25 11. A method as claimed in Claim 9 wherein metabolic precursor is selected from the group consisting of compounds of general formulae



and



or physiologically acceptable salts or esters thereof

wherein in each case n is selected such that the polymer or oligomer is readily metabolised

5 on administration to a human or animal body to provide elevated ketone body levels in blood

12. A method as claimed in Claim 11 wherein n is an integer of 0 to 1,000.

10 13. A method as claimed in Claim 11 wherein n is an integer of from 1 to 5.

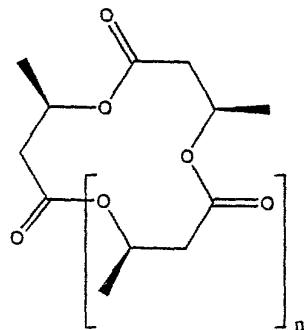
14. A method as claimed in Claim 1, Claim 2, Claim 3 or Claim 4 wherein the level of ketone bodies produced in the blood is in the ratio 1:1 to 20:1 of D- β -hydroxybutyrate to acetoacetate.

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15. A method as claimed in Claim 9 wherein the oligomer is a cyclic oligomer of formula

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10 where n is an integer of 1 or more
or a complex thereof with one or more cations or a salt thereof

16.. A method as claimed in Claim 15 wherein the one or more cations are selected from the group consisting of sodium, potassium, magnesium and calcium.

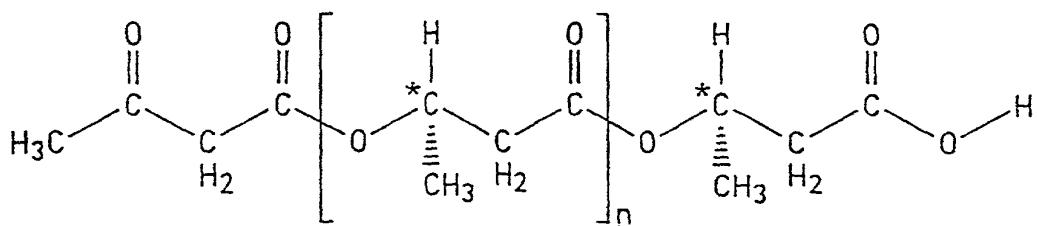
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17. A method as claimed in Claim 15 wherein n is an integer from 1 to 20.

18. A method as claimed in Claim 1 wherein it is (R, R, R)-4, 8, 12-trimethyl-1, 5, 9-trioxadodeca-2, 6, 10-trione.

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19. A compound of formula



or physiologically acceptable salts or esters thereof.

25 wherein n is an integer from 0 to 1000

20. A compound as defined in Claim 19 wherein the ester is selected from the group consisting of monohydric, dihydric or trihydric alcohol esters

5 21. A compound as claimed in Claim 19 wherein the ester is of (R)-1,3-butandiol.

22. A compound as claimed in Claim 19 wherein n is selected from the group of integers 0, 1, 2, 3 and 4.

10 23. A foodstuff comprising poly D- β -hydroxybutyrate characterised in that it is derived from a foodstuff generating organism that has had a gene capable of producing D- β -hydroxybutyrate inserted therein.

15 24. A foodstuff characterised in that it comprises at least 5% ketone bodies by weight.

25. A method for the synthesis of D- β -hydroxybutyryl-acetoacetate or poly or oligo-D- β -hydroxybutyryl-acetoacetate esters comprising the reaction of acetoacetic acid halide with D- β -hydroxybutyrate or poly- or oligo-D- β -hydroxybutyrate.

20 26. A method for synthesis of D- β -hydroxybutyryl-acetoacetate or oligo-D- β -hydroxybutyryl-acetoacetate comprising reacting D- β -hydroxybutyric acid with diketene.

25 27. A method of synthesising an oligomer of D- β -hydroxybutyric acid comprising heating a solution of D- β -hydroxybutyric acid in a solvent until an oligomer of a desired number of repeats is produced.

30 28. Use of D- β -hydroxybutyric acid, acetoacetate, or a metabolic precursor or physiologically acceptable salt of D- β -hydroxybutyric acid or acetoacetate for the manufacture of a medicament for the treatment of a disorder by a method as set out in any one of Claims 1 to 14 provided that when the use is of a metabolic precursor that is not racemic

hydroxybutyryl carnitine.

29. A foodstuff as claimed in Claim 23 or Claim 24 for use in therapy.

5 30. Poly-D- β -hydroxybutyrate for use in therapy

31. A composition comprising a compound selected from those claimed in any one of Claims 15 to 18 and poly D- β -hydroxybutyrate together with a physiologically acceptable carrier, in sterile and pyrogen free form.

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